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ABSTRACT

Affirmative action programs in U.S. medical schools have facilitated the entry and graduation of ethnic minority students. The number of Black physicians has doubled over the past decade. There have been even greater proportional increases in the number of Mexican-American, mainland Puerto Rican and Native American physicians. There is some question about whether or not these minority physicians are fulfilling other outcomes of affirmative action, such as choosing the primary care specialties, caring for minority patients, and practicing in areas where there is a shortage of physicians. This study compared Black, Mexican-American, mainland Puerto Rican, and Native American medical school graduates with their nonminority counterparts on affirmative action outcomes. The results include the following: (1) the minority graduates chose to specialize in primary care to a greater extent than nonminorities; (2) minority graduates practice in physician shortage areas at twice the rate of the nonminority graduates; (3) minority graduates are caring for significantly greater proportions of ethnic minority patients and patients supported by Medicaid; (4) a smaller proportion of minority graduates entered academic medicine; and (5) only about one-half of minority graduates had obtained board certification in their specialty compared to four-fifths of the nonminority graduates. In general, the results support the continuance of affirmative action in medical schools. The disparity in board certification should provide increased motivation to improve the early academic preparation of minority students. Statistical data are presented on 29 tables. A 38-item bibliography is included. (Author/VM)

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A Study of the Class of 1975

Steven N. Keith, Robert M. Bell,
Albert P. Williams

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August 1987

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Commonwealth Fund

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PREFACE

This work was undertaken to analyze outcomes of affirmative action in U.S. medical schools. To assess the success of these programs, the authors analyzed data on people who graduated from U.S. medical schools in 1975 to determine how specialty choice, practice location, patient populations served, and board certification rates differ between minority and nonminority graduates.

Preparation of this report was supported by a grant from the Commonwealth Fund and assisted by a grant from the Robert Wood Johnson Foundation Clinical Scholars Program. The work was performed under the project entitled "Analysis of Specialty Choice and Practice Location of Minority and Nonminority Physicians."

An abridged version of this report, entitled "Effects of Affirmation Action in Medical Schools: A Study of the Class of 1975," appeared in the *New England Journal of Medicine*, December 12, 1985.

Dr. Keith is an Assistant Professor of Pediatrics and Associate Dean for Student Affairs at the Charles R. Drew Medical School and the UCLA School of Medicine.

SUMMARY

Affirmative action programs in U.S. medical schools were designed to facilitate the entry and graduation of ethnic minority students. The success of these programs can be measured by the doubling of the number of black physicians over the past decade, and even greater proportional increases in the numbers of Mexican-American, mainland Puerto Rican, and Native American physicians. In addition to increasing the absolute number of minority physicians, "bonus" outcomes from affirmative action included (1) making the racial/ethnic mix of medical school classes approach that of the general population; (2) improving the upward social mobility of disadvantaged minority individuals by improving access to a prestigious profession; (3) eliminating racial barriers within the medical profession; (4) increasing the number of physicians who choose to care for minority populations specifically, and the poor more generally; (5) increasing the number of physicians choosing to practice the primary care specialties; and (6) rectifying the perceived geographic maldistribution of physicians.

Although consensus was reached on the general issue of affirmative action in medical schools, none was achieved on the relative importance of the multiple objectives related to affirmative action. Whether recently graduated minority physicians are achieving these sometimes competing objectives is an important health policy question. If minority physicians admitted to medical school during the era of affirmative action are choosing the primary care specialties, caring for minority patients, and practicing in physician shortage areas in significantly greater proportions than their nonminority counterparts, the argument for affirmative action will be strengthened.

This study compared the population of black, Mexican-American, mainland Puerto Rican, and Native American medical school graduates of the class of 1975 with a sample of their nonminority counterparts on choice of specialty, practice location, patient characteristics, and specialty board certification. It also sought to determine the relationship of premedical school performance and socioeconomic status to these outcome variables. Comparisons were based upon ethnic status, sex, and whether the physician graduated from one of the predominantly black medical schools, Howard and Meharry. Data were collected from the Association of American Medical Colleges, the American Medical Association *Physician Masterfile*, and a mailed survey instrument with telephone follow-up.

Compared with nonminorities, minority graduates of the class of 1975 chose to practice the primary care specialties in greater proportion, more in accord with federal health manpower policy of the 1970s. Although they entered the primary care specialties to a greater extent than nonminorities, there is an impressive dispersion of minority graduates across all specialties. Minority graduates are found to be practicing in physician shortage areas at twice the rate of their nonminority counterparts. Minority graduates are also caring for significantly greater proportions of ethnic minority patients and patients supported by Medicaid. A smaller proportion of minority graduates entered academic medicine than did their nonminority counterparts.

Only about one-half of the minority physicians had obtained board certification in their specialty, compared with four-fifths of the non-minority graduates. Specialty board certification relates to premedical school performance and the physician's patient population. Physicians with lower premedical school performance were less likely to have achieved board certification; because premedical school performance for nearly all the minority graduates was significantly below that of their nonminority counterparts, the difference in board certification rates is not unexpected. In addition, physicians who serve a substantial proportion of minority and poor patients obtained specialty board certification less often than did other physicians from the same ethnic groups. After controlling for premedical school performance and who the physician cared for, the difference in specialty board certification rates between minority and nonminority graduates lessened, but remained significant. Black graduates from Meharry were significantly less likely to have achieved specialty board certification than were black graduates from Howard and other medical schools.

The results for specialty choice, practice location, and patient characteristics support the continuance of affirmative action in medical schools. The disparity in specialty board certification rates should provide increased motivation to improve the early academic preparation of minority students, a step that could also increase the number of students qualified to pursue careers in medicine and other health professions.

Although affirmative action in medical education has not reached certain important goals, there is no question of its overall success. Our analysis demonstrated achievement of multiple objectives. Although some of these objectives compete, the success of affirmative action can be appreciated by all its advocates. Hence, we can avoid the uncomfortable task of weighting the multiple objectives.

ACKNOWLEDGMENTS

Many people have contributed to this research. August Swanson, Director of the Department of Academic Affairs and project leader of the AAMC grant, provided valuable guidance and criticism throughout the study and collaborated in the preparation of an article that summarized the results of this study (Keith et al., 1985). Staff from the UCLA School of Medicine Clinical Scholars Program, including Diane Watanabe and Nancy Ward, were extremely helpful in development of the research protocol and initial coding of data. Gene Roback, of the American Medical Association, facilitated our use of the *AMA Physician Masterfile*. RAND colleague Sally Trude assisted with statistical programming and Diane Schoeff with survey management. Thomas Maloney, Cynthia Woodcock, Robert Brook, Sinclair Coleman, and John Rolph provided valuable guidance and criticism. Sincere appreciation goes to the members of the Advisory Panel of the Commonwealth Fund: Robert H. Ebert, M. Alfred Haynes, Leon Johnson, George Lythcott, Sherman M. Mellincoff, and Alvin Tarlov.

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I. INTRODUCTION

The primary purpose of affirmative action programs in medical schools in the United States is to increase the proportion and absolute number of minority physicians. Several other outcomes from affirmative action have been identified as beneficial and desired, including bringing the racial and ethnic composition of medical school classes closer to parity with the general population, increasing the number of physicians who choose to care for minority populations specifically and the poor in general, eliminating racial and ethnic barriers in medicine, enhancing the upward social mobility of disadvantaged minority groups by providing access to a prestigious profession, changing the specialty mix within the medical profession to emphasize primary care, and rectifying the perceived geographic maldistribution of physicians.

Numerically, affirmative action programs have been a clear success: The number of minority physicians has doubled over the past decade (U.S. DHEW, 1975, 1984). Yet few people concerned with affirmative action would equate that numerical achievement with success in attaining broader social and health policy goals. The purpose of this study was to assess the achievement of those goals and evaluate the wider outcomes of affirmative action. To do so, we compared minority and nonminority graduates of the U.S. medical school class of 1975 for the characteristics of choice of specialty, choice of practice location, patient population served, and specialty board certification.

Before 1960, a large proportion of black physicians served in general practice or one of the other primary care specialties; and the overwhelming majority practiced in the black community, caring almost exclusively for black patients. Similar data for other ethnic minority physicians and populations are lacking.

As a result of affirmative action in medical schools, the number of black physicians has doubled over the past decade. The number of Mexican-American, mainland Puerto Rican, and Native American physicians has also significantly increased.

Beyond the impressive increase in the number of black and other minority graduates from U.S. medical schools, affirmative action has affected several medical practice characteristics.

AFFIRMATIVE ACTION IN MEDICAL EDUCATION

Affirmative action in medical schools has been justified by the argument that, because minority students have historically been excluded unfairly on racial grounds, it is morally right to admit them in large numbers to make up for past injustices. In 1970, the Association of American Medical Colleges (AAMC) Task Force on Expanding Educational Opportunities in Medicine for Blacks and Other Minorities proposed a strategy to increase the representation of minorities in the medical profession (AAMC, 1970). The long-term goal was to "achieve equality of opportunity by relieving or eliminating inequitable barriers and constraints to access to the medical profession." The short-term goal was to increase the proportion of minority students in U.S. medical schools from 2.8 to 12 percent by 1975 or 1976.

Progress was made, but this ambitious goal was not met. By 1976, the total enrollment of blacks, Mexican-Americans, Native Americans, and mainland Puerto Ricans in the medical schools had risen to 8.2 percent of the total, but there has been almost no growth since then (AAMC, 1985). Both the total enrollment and number of new minority entrants to U.S. medical schools was 8.5 percent for the year 1985-1986.

To admit the number of minority students necessary to raise their representation in medical schools to the level of that in the general population required special programs. Admission standards were relaxed to reach the original AAMC goals, and this action attracted much criticism. Many argued that the lowering of entrance standards, however well motivated, would produce inferior physicians. In two Supreme Court cases (*Defunis and Bakke*), affirmative action was challenged on the grounds that it was reverse discrimination, and the resulting court decisions left many admission committees at medical schools wary of affirmative action. The leveling off of minority enrollment below target levels has become a matter of growing concern. A 1976 Macy Commission offered its diagnosis of the problem: "The situation has resulted from decreased medical school recruitment efforts, lack of financial support, and a crush of better qualified applicants" (Macy Commission Report, 1976). An evaluation of the effectiveness of medical school affirmative action that demonstrates benefits beyond increasing the number of black and other minority physicians could prompt renewed commitment.

The purpose of this study was to assess the effect of affirmative action programs on the broader social goals of increasing the number of physicians who choose the primary care specialties, choose to practice in physician shortage areas, and care for poor and ethnic minority

patients. Because other programs have sought to expand opportunities for minorities in academic medicine and biomedical research, we also analyzed factors that appear to be associated with such career choices. Finally, to assess the success of graduate medical education or specialty training, we examined specialty board certification among recently graduated physicians. For all these outcome measures, we compared minority and nonminority U.S. medical school graduates of the class of 1975. We analyzed relationships between these outcome variables and certain premedical school and demographic characteristics to determine the extent to which the desired health policy outcomes can be predicted from premedical school student data.

BACKGROUND

Before 1970, the delivery of health care in black and other minority communities had been left primarily to health professionals of the same ethnic background. Yet, during the same period, black and other minority physicians were vastly underrepresented compared with their proportion in the overall population. According to the 1970 Census, blacks accounted for 11.1 percent of the U.S. population but only 2.1 percent of U.S. physicians (U.S. DHEW, 1975). Only 2.8 percent of the total number of students enrolled in U.S. medical schools were black, more than three-fifths of whom studied at two predominantly black schools, Howard and Meharry (AAMC, 1976; Haynes, 1969). The 1970 Census also lists 175 American Indian medical and osteopathic physicians, representing less than 0.1 percent of the total number of physicians (U.S. DHEW, 1975). Neither Mexican-American nor mainland Puerto Rican physicians are noted separately in the 1970 Census.

Practice Characteristics of Minority Physicians Before Affirmative Action

A few limited studies have been undertaken to look at various characteristics of black and other minority physicians before affirmative action. Haynes (1969) found 39 percent of black physicians in general practice in 1967 compared with 23 percent of all physicians. Black physicians tended to locate their practices where there was the largest growth in the black population, to a much greater extent than nonblack physicians (Cornely, 1944; Thompson, 1974). Lieberman (1958) suggested that the ethnic identification of physicians greatly influences their pattern of medical practice. Elesh and Schollaert

(1972) studied factors affecting the distribution of physicians in Chicago and found that physicians in general tend to avoid practice in predominantly low income and black areas of the city. Rocheleau (1978) found black physicians are far more likely to serve black patients than are nonblack physicians. In a survey of several cohorts of graduates from the Howard University College of Medicine, Lloyd and Johnson (1982) found a large proportion of graduates had chosen the primary-care specialties, practiced in the inner city, and cared for large numbers of poor black patients.

In the past, the choice of practice locations by minority physicians may have been influenced by sociological forces that cannot be learned readily. Particularly before the 1960s, the segregation of neighborhoods and general racial bias may have prevented minority physicians from establishing economically viable practices outside their own ethnic communities. More recently, however, segregation patterns have seemed to exert less influence on practice choice.

Specialty Choice and Practice Location

Increasing the number of physicians in the primary care specialties of Family Practice, General Internal Medicine, General Pediatrics, and Obstetrics and Gynecology was a major goal of the 1970s. Another goal was reducing the number of rural and urban medically underserved communities. Under the federal health manpower legislation enacted in 1971 and 1976, medical schools were required to increase the number of graduate training positions in primary care to at least 50 percent of the total in an effort to reverse the trend toward increasing subspecialization among physicians. At the same time, medical schools were required to greatly increase class size, with the assumption that, by increasing the supply of medical manpower, physicians would diffuse into underserved areas.

Several studies have looked at determinant factors of choice of medical specialty and practice location, but the vast majority suffer from common shortcomings. Many of these studies were performed on medical school cohorts from the early 1960s, when there was much less emphasis on subspecialization; a general practitioner was one who completed only an internship and was generally considered of lesser competence. Also, most of the studies utilized a small cohort from one or two medical schools, raising questions of external validity. Few of the previous studies utilized appropriate statistical methods to analyze multiple outcome variables. And almost none of the studies sought to compare medical students or physicians from different racial or ethnic backgrounds.

Factors assumed to affect specialty choice may be grouped into three general categories: (1) sociodemographic, (2) institutional or structural, and (3) personal characteristics. Among the sociodemographic variables, age, marital status, community of origin, and social class have been found to be associated with specialty choice (Heald, Cooper, and Coleman, 1974; Monk and Terris, 1956; Paiva and Haley, 1971; and Weiskotten et al., 1960). Race has not been studied. The effect of institutional or structural variables on specialty choice has been studied only from the viewpoint of the medical school and graduate training. Some researchers believe that these variables contribute more to variation in specialty choice than sociodemographic or personality factors (Zuckerman, 1978). There is no information on the influence of premedical school structural factors. Personality factors have not been shown to predict specialty choice, other than for the surgical specialties and psychiatry. Furthermore, personality tests, which have problems with validity and reliability, would be nearly impossible to administer to an entire cohort of medical school applicants.

Factors found to affect decisions on practice location include community of origin of physician and spouse (Heald, Cooper, and Coleman, 1974), location of medical school and graduate training (Mardam, 1966; Yett and Sloan, 1974), and income levels in the area of practice, among other sociodemographic variables (Guzick and Jahiel, 1976; Kaplan and Leinhardt, 1973).

II. DATA COLLECTION AND ANALYTIC METHODS

Data collection involved two phases. First, the Association of American Medical Colleges (AAMC) provided data on physicians who graduated from U.S. medical schools between July 1, 1974, and June 30, 1975. Using these data, we selected a sample of nonminority physicians to survey. The second phase of data collection involved surveying all minority physicians and the sample of nonminority physicians to determine various characteristics of their medical practices and obtaining additional data from the *Physician Masterfile* maintained by the American Medical Association (AMA). We chose the class of 1975 for study because that is the most recent cohort for which we could collect stable and reliable data on specialty, practice location, patient characteristics, and specialty board certification. This section describes the sample selection, the data collection methods, response rates, variable definitions, and analytic methods.

SELECTION OF VARIABLES

Variables thought to be related to choice of specialty, practice location, patient characteristics, and specialty board certification were chosen for several reasons. Previous studies have demonstrated various relationships to these outcomes, such as premedical school performance with specialty choice and the physician's ethnic status with patient characteristics.

Using discriminate analysis, Rolph, Williams, and Laniear (1978) found that specialty choice, personal characteristics, and selected practice characteristics of physicians related more closely to premedical school and medical school performance than to the level of federal research funding in medical schools. They also demonstrated that performance on the two National Board of Medical Examiners' examinations taken during premedical school could be predicted by premedical school performance measures. Similarly, premedical school performance measures may be significantly related to the achievement of specialty board certification and other physician performance criteria.

Bell (1977) found physician performance on the American Board of Internal Medicine written examination to be significantly associated with medical school and premedical school performance. Achievement

of specialty board certification and the relative scores on the examination may relate to physician performance and the quality of care provided.

Also, several hypotheses were formed concerning the relationship between quantitatively measurable variables and these outcomes: Premedical school performance should relate directly to the rates or probability of board certification, and socioeconomic status should relate to practice location and patient characteristics. Further, the independent variables were selected because of their ease of gathering and measurement. On the survey, we chose to limit the data requested to verifying the primary office address, specialty and specialty board certification, and percentage estimates for Medicaid patients and specific ethnic groups of patients in the physician's practice.

PRELIMINARY DATA COLLECTION

The AAMC provided a list of graduates from each medical school along with information about undergraduate science grade point average (GPA) and scores on the four components of the Medical College Admission Test (MCAT). They also provided demographic data that included name, sex, parents' education and occupations, and self-identified ethnicity.

We summarized the performance data using an index that had been developed by regression analysis to predict scores on the National Board of Medical Examiners Part II Exam (Rolph, Williams, and Lanier, 1978). The prediction index included an empirically derived adjustment for cases where the undergraduate science GPA was unavailable. However, when MCAT scores were unavailable, we treated the performance index as missing. This happened for fewer than 2 percent of all graduates.

Parents' education and occupations were combined to create a single socioeconomic status (SES) index, using a slightly modified version of the Hollingshead Two-Factor Index of Social Position (Hollingshead, 1965; Hollingshead and Redlich, 1958). Education levels and occupations for each parent were classified separately into six ordered categories. The family's score for each factor equaled the higher of the mother's score or the father's score. We set the SES index equal to a linear combination of the scores for the two factors, with occupation receiving 1.75 times the weight of education. When no data were available for one factor, the score was estimated from the value for the other factor. When data were available for neither factor, the SES index was treated as missing.

SELECTING A SAMPLE OF NONMINORITY PHYSICIANS TO SURVEY

Cost constraints prohibited us from surveying the entire medical school class of 1975. To maximize our ability to contrast minority and nonminority physicians within these constraints, we surveyed the complete population of 715 minority physicians but only a sample of nonminority physicians. We also took steps to increase comparability of the nonminority sample with the minority population beyond what would have occurred using a simple random sample of nonminorities. The resulting sample included 1862 nonminority physicians from the population of 9686 identified by the AAMC.

Comparison of the Populations

The population of minority graduates had much lower preadmission performance and SES indexes than did the population of nonminority graduates. The first two columns of Table 1 compare performance index distributions for the populations of all minority and nonminority physicians in the class of 1975. Approximately two-thirds of minority graduates had performance indexes that would rank in the bottom 7 percent for all nonminorities. The mean score of 515 for nonminorities exceeds that of 432 for minorities by 1.6 standard deviations (using the standard deviation for minorities). There are substantial but less pronounced differences between the two populations in terms of SES status also (Table 2). The mean for nonminorities was 0.6 standard deviations above that for minorities. The two populations also differed substantially in their distributions among the 107 medical schools represented in the class of 1975.

Clearly, there were very few nonminorities who resembled the "average" minority in terms of preadmission performance and almost none who resembled the "below-average" minority. If we had studied a simple random sample of nonminorities, it would have been very difficult to determine whether different practice characteristics of the two samples resulted from minority status per se or from the large differences in measurable background characteristics. Despite our efforts to enhance the comparability of the minority and nonminority samples, substantial differences remained for the performance index and SES.

Table 1

DISTRIBUTION IN PERCENTAGES ACROSS PERFORMANCE CATEGORIES
FOR POPULATIONS AND SAMPLES OF MINORITY AND
NONMINORITY PHYSICIANS

Performance Category	Minority Population/ Sample ^a	Nonminority		
		Population	Selection Probability	Sample
300-399	28	0.4	1.00	2
400-449	40	6	0.62	19
450-499	21	30	0.26	39
500-549	9	43	0.13	30
550-650	2	21	0.10	10
Total	100	100	0.19	100
Mean Performance Index	432	515	—	489

^aFor minority physicians, the sample who were selected to be surveyed coincided with the population.

Table 2

DISTRIBUTION IN PERCENTAGES ACROSS SES CATEGORIES
FOR POPULATIONS AND SAMPLES OF MINORITY AND
NONMINORITY PHYSICIANS

Socioeconomic Category	Minority Population/ Sample ^a	Nonminority		
		Population	Selection Probability	Sample
14-44	37	15	0.23	18
45-59	22	36	0.19	36
60-69	18	32	0.18	30
Missing data	23	17	0.18	16
Total	100	100	0.19	100
Mean SES index	43.7	54.6	—	53.4

^aFor minority physicians, the sample who were selected to be surveyed coincided with the population.

Comparison of the Samples

We selected a sample of nonminority physicians that more closely resembled the population of minorities in terms of the performance index, SES, and medical school attended than did the population of all nonminority physicians. As noted above, we selected a complete sample of the minority population. We increased the comparability of the two samples by sampling nonminority physicians who resembled minorities with greater probability than nonminority physicians who did not resemble minorities. For example, we selected 100 percent of nonminority physicians in the lowest performance category and only 10 percent of those in the highest category (Table 2, "Selection Probability").

Although these methods increased comparability of the two samples, substantial differences remain. The mean performance index in the nonminority sample still exceeds that in the minority sample by 1.1 standard deviations (compared with 1.6 standard deviations between the two populations). For SES, the sampling method reduced the difference only slightly (by about 0.07 standard deviations).

Details of the Procedure for Sampling Nonminority Physicians

The sample who received our survey was drawn from the AAMC population of graduates. Of 13,428 physicians who graduated from U.S. medical schools between July 1, 1974, and July 30, 1975, AAMC files provided data on 12,065. Of those, 715 were classified as minorities: 574 blacks, 78 Mexican-Americans, 36 American Indians, 25 mainland Puerto Ricans, and 2 Commonwealth Puerto Ricans. Another 9686 were classified as nonminorities: 9467 whites and 219 Orientals. We excluded 1664 other physicians whose race was either unknown ($n = 1488$) or listed as other ($n = 176$). Of the 9686 white and Oriental physicians, 163 were missing a set of complete MCAT scores. Because computation of the performance index was critical to selection of the nonminority sample, our sample was selected from the remaining 9523 physicians.

The proportion of nonminorities sampled from each medical school increased with the proportion of minorities in the graduating class. We selected all the nonminorities from the two predominantly black medical schools, Howard and Meharry. For each other medical school we set

$$0.11 \times (\text{number of nonminorities}) + 1.4 \times (\text{number of minorities}) \quad (1)$$

as the target sample size for nonminority graduates from that medical school. Thus, the nonminorities sampled from a medical school ranged from 11 percent for schools with no minority graduates to about 37 percent for two medical schools with 20 percent minorities (ignoring Howard and Meharry).

Within each medical school we selected a random sample of non-minority physicians using performance index and SES as stratifying variables. The main stratification was based on performance index, with three strata defined relative to the distribution of performance indexes for nonminority graduates from that school. Suppose that Eq. (1) defined a target sample size of 16.8 nonminority graduates from a particular medical school. Table 3 shows how the stratum would have been defined and how many nonminority graduates would have been selected from each stratum. The phrase "very bottom of medical school" means that the nonminorities with the seven lowest performance indexes would each have been selected with certainty. The number seven results from taking 40 percent of 16.8 to obtain 6.72 and rounding the result to the nearest integer.

Random samples would have been taken from the other two strata—seven nonminority graduates with below-average performance indexes (but not ranking in the bottom seven) and three with above-average performance indexes. From within each of these two strata, graduates with low SES—defined as below the 40th percentile for all nonminority physicians—were selected with probability 1.5 times that of physicians with high or missing SES.

Table 3

DEFINITION AND SIZE OF PERFORMANCE-INDEX STRATA
USED TO SELECT NONMINORITY SAMPLE
FROM A HYPOTHETICAL SCHOOL

Performance Stratum	Percentage of Sample	Hypothetical Number ^a
Very lowest from the medical school	40	7
Others below median	40	7
At or above median	20	3
Total	100	17

^aBased on target sample size of 16.8 nonminority graduates.

SURVEY DATA COLLECTION

Data on type of practice, primary and secondary specialty, and primary office address were obtained from the *AMA Physician Masterfile* for 1845 of the 1862 nonminority graduates and 690 of the 714 minority graduates. We obtained addresses for 19 more minority physicians from the medical schools where they graduated. These additional addresses raised totals above 99 percent for each group.

In March 1982, the minority physicians were mailed a survey to confirm or revise the information from the *AMA Physician Masterfile* and to provide open-ended data on the percentage of (1) white, black, Mexican-American, Puerto Rican, American Indian, and other ethnic group patients in the physician's practice; and (2) Medicaid-supported patients in the physician's practice. The same survey was mailed to the nonminority physicians in December 1982.

Response to the Survey

Initial nonrespondents were contacted by telephone to encourage their completion of the questionnaire. This yielded response rates of 77 percent for the minority and 85 percent for the nonminority cohorts, comparing favorably with those obtained in other studies of physicians (Linn and Lewis, 1979; Wechsler, Dorsey, and Bovey, 1978; and Wells et al., 1984). This report describes results of analysis on the graduates who completed the survey.

Using data from the AAMC and the *AMA Physician Masterfile*, we compared characteristics of those who did and did not respond to the survey. The difference in response rates between minorities and nonminorities is statistically significant ($p < .001$, χ^2 with 1 d.f.). However, when that difference is accounted for, nonrespondents do not differ significantly from respondents in terms of performance index or SES. Among minorities, American Indians and Mexican-Americans responded more frequently than did blacks and Puerto Ricans ($p < .02$, χ^2 with 3 d.f.).

Because the *AMA Physician Masterfile* included data on practice specialties, we were able to compare response rates of primary care physicians with those of nonprimary care physicians. Nonminorities practicing primary care responded less often than their nonprimary care counterparts ($p < .05$, χ^2 with 1 d.f.). However, although inclusion of nonrespondents would have increased the percentage of nonminority physicians in primary care by 1.2 percent, it also would have increased the minorities in primary care by 0.6 percent. Thus, the change in the relative difference would have been small. Because the

survey data provided the greatest opportunity for physicians to indicate that they practice subspecialties and correct errors on the *AMA Physician Masterfile*, we chose to base all results on the survey data.

We found no statistical evidence that nonresponse biased our comparisons between minorities and nonminorities. That is, there were no variables for which the response pattern for minorities differed significantly from that for nonminorities. Thus, there was no indication that comparisons between minorities and nonminorities would have changed in any particular direction if we could have achieved a response rate of 100 percent.

Definitions of Practice Variables

The categories and codes used for primary and secondary specialty and type of practice match those used in the *AMA Physician Masterfile*.¹ We define family or general practice, general internal medicine, general pediatrics, and obstetrics/gynecology as primary care specialties.² If a physician named internal medicine as the primary specialty and an internal medicine subspecialty (e.g., nephrology) as the secondary specialty, he or she was considered an internal medicine subspecialist.

Using primary-practice addresses obtained from the surveys, we determined whether the physician located in a federal health manpower shortage area (Public Health Service Act, Sec. 332, 1982). Although the designation of shortage areas follows objective criteria, several factors limit the validity of this variable as a measure of whether a physician serves patients who otherwise might lack access to care. Shortage area designations depend on the number of physicians in an area, without regard for how much time they spend in the area. Typically, consideration for inclusion on the list is initiated by local officials, so that qualified areas may be overlooked. Also, physicians located just inside the boundary of a shortage area may be no more likely to serve patients within the area than physicians located near but outside the boundary.

We obtained data on specialty board certification for both the minority and nonminority cohorts from the *AMA Physician Masterfile*

¹Following publication of Keith et al. (1985), we reclassified about 1 percent of the physicians from the catchall category "other specialties" into one of the other seven specialty categories. That correction accounts for many small discrepancies between that article and this report but did not cause any substantial changes.

²Pediatrics included neonatal-perinatal medicine, pediatric cardiology, pediatric hematology-oncology, and pediatric nephrology. Pediatric surgery was classified in the general surgery category.

during the fall of 1984. Analysis of specialty-board certification considered only whether a physician had become certified by a single specialty board, not whether a certifying examination had been attempted or the number of boards passed.

Seeking information on attitudes toward primary care specialties or practice in underserved areas would have added to the length of the survey instrument and possibly decreased our response rate. Also, demonstrating the validity of these items would have required testing of the instrument prior to administration, adding to cost and time. Assessment of medical school admission committee weighting of cognitive and noncognitive characteristics was not possible. Rolph and his colleagues (1978) demonstrated different weighting of cognitive characteristics for minority and nonminority applicants to medical schools. Medical school admission committees may have weighted such noncognitive characteristics as attitudes, motivation, and work experience (rather than science, GPAs and GCAT scores) more heavily for minority applicants. And commitment to primary care specialties and practice in underserved areas may have been more heavily weighted for minority than for nonminority applicants. Retrospective measurement of such weighting for all U.S. medical schools was not possible. Seeking information on the survey as to whether the physician had unsuccessfully attempted specialty board certification would probably have led to systematic underreporting and been difficult to validate.

Other factors that may relate to the outcome variables that we chose not to assess include attitudes of physicians toward primary care versus nonprimary care specialties, indebtedness from educational loans, and spousal preferences. Problems with reliability and validity for many of these variables precluded their inclusion in the study.

ANALYTIC METHODS

Samples for Various Analyses

Results reported in the following sections rest completely on data for physicians who returned our survey. Analyses of specialty choice and board certification both excluded 20 of the above physicians for whom we could not obtain specialty-choice data. In addition, 16 physicians specializing in neurological surgery were excluded from analysis of board certification because they lacked sufficient time to qualify for and obtain certification in that specialty. Analysis of practice type excluded 40 physicians whose primary practice type was not classified in the *AMA Physician Masterfile*.

Analyses of dependent variables gathered solely through the survey obviously required that the physician had provided the appropriate data. For analyses of patient characteristics—minority patients, Medicaid-supported patients, and practice location—we also limited analysis to physicians whose primary activity was direct patient care rather than teaching, research, administration, etc.

Statistical Techniques

For simplicity, most results are presented in tables of unadjusted means or percentages with a practice characteristic as a function of the variables that relate most strongly to the characteristic. In each case, we have performed multivariate analyses (e.g., linear and logistic regression)³ to check that controlling for variables omitted from the tables would neither have altered results substantially nor have changed conclusions. Where they contribute to understanding—e.g., for analysis of specialty board certification—“adjusted” results from these multivariate analyses are reported.

Most statistical tests of significance in the report use Pearson's χ^2 test (for testing association of two categorical variables) or analysis of variance (for one continuous and one categorical variable), often holding constant another variable such as minority status.⁴ When more complex relationships are under study, tests are based on linear or logistic regression.

We have not attempted to “reweight” the nonminority sample to look like either the nonminority population or the minority population. Given the large differences between the minority and nonminority populations, we do not see any special purpose in comparing outcomes of the two populations. Nor, in general, could weighting or any other procedure adequately adjust results of the nonminority population to reflect what would have occurred had they looked like the minority population. Instead, we usually compare results between cohorts for each performance stratum.

³Logistic regression is an analog of linear regression that is appropriate for use with a dichotomous dependent variable.

⁴For χ^2 tests on two-by-two tables (one d.f.), p-values are based on Fisher's exact test.

III. PRACTICE CHARACTERISTICS

Factors affecting specialty choice that are examined in this section include predicted performance on the Part II examination of the National Board of Medical Examiners (Performance Index), SES, the sex of both minority and nonminority graduates, school attended, and whether the school attended had a Department of Family Medicine. Factors associated with practice location include the Performance Index and SES. Patient characteristics in a particular physician's practice are associated with the location of the practice, ethnicity of the physician, and accepted reimbursement for medical services.

SPECIALTY CHOICE

During their fourth year in medical school, students determine which specialty they wish to pursue and seek appropriate training positions. These decisions are usually based upon their experiences in each specialty during medical school, with many other factors having an effect.

More than one third more minority graduates than nonminority graduates chose primary care specialties (Table 4). The largest difference occurred for obstetrics/gynecology, which minorities entered at twice the frequency of nonminorities ($p < 0.001$). Minority graduates also showed a greater tendency than nonminority graduates to choose pediatrics ($p = 0.02$) and family or general practice ($p = 0.07$).

Each of the four categories of nonprimary care specialties had a lower proportion of minority physicians, but the only statistically significant difference ($p < 0.001$) occurred in the category that included "other" specialties (such as dermatology, pathology, and psychiatry). Conditional on a physician choosing to practice a nonprimary care specialty, there was no statistically significant relationship between ethnic status and the specialty chosen.

Performance and SES

The choice of specialty related significantly to predicted performance on the Part II examination of the National Board of Medical Examiners, for both the minority ($p = 0.01$) and nonminority ($p = < 0.001$) graduates (Table 5). However, the pattern of relations between specialty choice and performance differed between groups ($p =$

Table 4

SPECIALTY CATEGORIES OF THE CLASS OF 1975, ACCORDING TO ETHNIC STATUS
(Percentage)

Specialty Category	Minority (n = 542)	Nonminority (n = 1549)	Minority/ Nonminority Ratio ^a	p-value ^b
Family/general practice	14.6	11.6	1.26	.07
General pediatrics	10.1	6.9	1.47	.02
Obstetrics/gynecology	14.8	7.4	1.90	< .001
General internal medicine	16.4	15.6	1.05	NS
Primary care subtotal	55.9	41.5	1.35	< .001
Internal medicine subspecialties	10.0	11.2	0.89	NS
General surgery	5.0	6.3	0.79	NS
Surgical subspecialties	12.4	15.8	0.78	.06
Other specialties	16.8	25.2	0.67	< .001
Nonprimary care subtotal	44.1	58.5	0.75	< .001

^aRatio of minority percentage to nonminority percentage.

^bp-values correspond to a test of the hypothesis that the ratio in the population is 1. Each p-value is based on a χ^2 test with 1 degree of freedom.

NS indicates not significant at a level of $p < 0.10$.

0.03 for interaction term in two-way ANOVA).¹ Most striking, nonminority graduates who chose internal medicine subspecialties ranked highest in their group, whereas minority graduates in these subspecialties ranked near the lowest. For both minorities and nonminorities, the mean performance index was very high for "all other specialties" and very low for obstetrics/gynecology.

The variation among specialties in mean performance index did not relate to whether the physicians were primary care specialists (F-test with 1 and 6 d.f., from repeated measures ANOVA). Thus, the greater tendency for minority graduates to enter primary care was not explained by this group's lower score on the performance index.

The backgrounds of the nonminority graduates, as assessed by our socioeconomic index, related weakly ($p = 0.06$) to their specialty choices (Table 6). Graduates from lower socioeconomic strata tended to enter family practice or pediatrics, and those from the higher strata tended to enter the surgical subspecialties. The relationship for the minority graduates did not achieve statistical significance.

¹Analysis of Variance

Table 5

MEAN UNDERGRADUATE PERFORMANCE INDEX, ACCORDING TO
SPECIALTY CATEGORY AND ETHNIC STATUS^a

Specialty Category	Minority	Nonminority
Family/general practice	424	483
General pediatrics	449	490
Obstetrics/gynecology	424	469
General internal medicine	431	494
Primary-care mean	431	486
Internal medicine subspecialties	425	499
General surgery	431	478
Surgical subspecialties	429	481
Other specialties	447	496
Nonprimary care mean	435	491
Overall mean	433	489
Overall standard deviation	52	46

^aThe mean performance index for all nonminority students in the class of 1975 was 515. The means of the performance index differ among the eight specialties at $p = 0.01$ for minority students and $p < 0.001$ for nonminority students (separate one-way analyses of variance).

Table 6

MEAN SOCIOECONOMIC INDEX, ACCORDING TO SPECIALTY
CATEGORY AND ETHNIC STATUS^a

Specialty Category	Minority	Nonminority
Family/general practice	41.1	51.4
General pediatrics	47.2	51.9
Obstetrics/gynecology	44.6	52.6
General internal medicine	41.9	54.3
Primary care mean	43.5	52.8
Internal medicine subspecialties	44.4	53.9
General surgery	42.1	53.7
Surgical subspecialties	40.5	55.6
Other specialties	46.8	53.6
Nonprimary care mean	44.0	54.2
Overall mean	43.7	53.6
Overall standard deviation	17.5	12.2

^aThe means of the socioeconomic index differ significantly among the eight specialties at $p = 0.06$ for nonminorities; the differences are not statistically significant for minorities.

Sex

Both minority and nonminority women demonstrated very different specialty-choice patterns from their male counterparts (Table 7). The between-sex differences appear more clearly in Table 8, which shows ratios of the percentage of women choosing each specialty category to the percentage of men. Ratios above 1.0 for a row indicate that women in our sample entered that specialty category at a greater rate than men did. Ratios below 1.0 indicate an underrepresentation of women in the specialty category. The last two columns of Table 8 specify which differences from 1.0 achieved statistical significance.

Sex-related differences in specialty choice displayed the same general pattern for both minorities and nonminorities. Relative to male physicians, females showed the strongest preference for pediatrics, which they entered from 2.3 to 3.3 times as often as men did. The next strongest preference was for the heterogeneous category "Other nonprimary care," although that preference was statistically significant only for nonminorities. The particular specialties that contributed most to the high representation of women were: dermatology,

Table 7

DISTRIBUTION OF SPECIALTY CHOICE, BY SEX AND MINORITY STATUS^a
(Percentage)

Specialty Category	Minority		Nonminority	
	Women	Men	Women	Men
Family/general practice	9	16	11	12
General pediatrics	24	7	14	6
Obstetrics/gynecology	13	15	8	7
General internal medicine	21	16	16	16
Primary care total	66	54	49	40
Internal medicine subspecialties	8	10	6	12
General surgery	2	6	2	7
Surgical subspecialties	3	14	6	17
Other specialties	21	16	37	24
Nonprimary care total	34	46	51	60
Sample size	92	450	186	1363

^aFor both minorities and nonminorities, the specialty distribution for women differs significantly from that for men ($p < .001$, χ^2 with 7 d.f.).

Table 8

RATIO OF PERCENTAGE OF WOMEN TO PERCENTAGE OF MEN WHO CHOSE EACH SPECIALTY CATEGORY, BY MINORITY STATUS (Percentage)

Specialty Category	Ratio of percentages ^a		p-value ^b	
	Minority	Nonminority	Minority	Nonminority
Family/general practice	0.6	0.9	—	—
General pediatrics	3.3	2.3	.001	.001
Obstetrics/gynecology	0.9	1.1	—	—
General internal medicine	1.3	1.0	—	—
Primary care total	1.2	1.2	.03	.03
Internal medicine subspecialties	0.7	0.5	—	.01
General surgery	0.4	0.3	—	.01
Surgical subspecialties	0.2	0.3	.003	.001
Other specialties	1.3	1.6	—	.001
Nonprimary care	0.7	0.9	.03	.03

^aRatio of percentage in column of Table 7 labeled "Women" to percentage in adjacent column labeled "Men."

^bp-value for χ^2 test that ratio equals 1.0—that the percentage of women choosing the specialty equals the percentage of men doing so.

—Ratio does not differ from 1.0 at 0.10 significance level.

psychiatry, and pathology (each with ratios exceeding 2.0). Women entered surgical specialties (both general and subspecialties) only about one third as often as men did. They also seemed to avoid internal medicine subspecialties. Overall, women were slightly more likely to enter primary-care specialties ($p = .03$ for both minorities and nonminorities). Black graduates from all medical schools showed the same pattern of differences between sexes as was found in the total minority group (Table 9).

Black Graduates from Howard and Meharry

Comparing the black graduates from Howard and Meharry with black graduates from the other medical schools (Table 10), we found a significantly greater proportion from Howard and Meharry entered obstetrics/gynecology ($p = 0.02$); however, no other differences were statistically significant. Even though the proportion of black graduates from Howard and Meharry entering the primary care specialties was

Table 9

SPECIALTY CATEGORIES OF BLACK GRADUATES, BY SEX

Specialty Category	Male	Female
Family/general practice	15	9
General pediatrics	7	23
Obstetrics/gynecology	16	15
General internal medicine	17	19
Primary care total	54	67
Internal medicine subspecialties	12	9
General surgery	6	1
Surgical subspecialties	15	4
Other specialties	13	19
Nonprimary care total	46	33
Sample size	345	78

greater than the proportion from the other medical schools, this difference was not statistically significant. A comparison of graduates from Howard with those from Meharry in terms of specialty choice did not reveal significant differences.

Influence of a Department of Family Medicine on Specialty Choice

To determine what effect the medical school may have had on the graduate's specialty choice, a gross measure of the school's orientation toward primary care was utilized. In the early 1970s, family medicine reemerged as a specialty in medical school curricula along with a surge in the emphasis in training primary care physicians. Presence or absence of a family medicine program or department in an individual medical school could therefore be used as a proxy for the school's orientation toward primary care. The expected result would be that a greater proportion of graduates from schools with family medicine programs or departments would enter the primary care specialties, especially family medicine, compared with schools without family medicine programs or departments.

For both minorities and nonminorities, graduates of schools with family medicine programs or departments chose primary care specialties at a substantially higher rate (20 to 30 percent greater) than did graduates of medical schools without such programs or departments

Table 10
SPECIALTY CATEGORIES OF BLACK GRADUATES,
BY SCHOOL ATTENDED

Specialty Category	Howard and Meharry	All Other Schools
Family/general practice	12	14
General pediatrics	12	9
Obstetrics/gynecology	24	13
General internal medicine	17	17
Primary care total	65	54
Internal medicine subspecialties	8	12
General surgery	4	5
Surgical subspecialties	14	12
Other specialties	10	17
Nonprimary care total	35	46
Sample size	93	330

(Table 11). However, the specific manifestation of the increase differed between cohorts. For nonminorities, the entire increase appeared in family/general practice. In contrast, the effect for minorities occurred about equally in all primary-care specialties.²

PRACTICE LOCATION

Upon completion of graduate or residency training in their particular specialty, physicians choose an urban, suburban, or rural area within which to begin practice. Most physicians enter direct patient care rather than teaching and research, administration, or other non-clinical career paths.

Analysis of data concerning practice location includes only those physicians involved in direct patient care.

Overall, minority graduates were practicing in federally designated health manpower shortage areas at almost twice the rate of

²Consider only physicians who did select a primary-care specialty. Among this restricted group of minorities, there is essentially no relationship between the presence of a family medicine program and specialty category. For nonminorities, the presence of a family medicine program relates very strongly to the choice of family/general practice.

Table 11

PERCENTAGE OF PHYSICIANS WHO SELECTED FAMILY/GENERAL PRACTICE AND OTHER PRIMARY CARE SPECIALTIES, BY MINORITY STATUS AND WHETHER THEIR MEDICAL SCHOOL HAD A FAMILY MEDICINE DEPARTMENT

Specialty Selected	Minority			Nonminority		
	Family Medicine Department		p-value for Difference ^a	Family Medicine Department		p-value for Difference ^a
	Yes	No		Yes	No	
Family/general practice	16.6	10.9	.12	14.3	7.2	.001
Other primary care	44.4	35.7	.07	30.2	29.5	(b)
Primary care total	61.0	46.6	.004	44.5	36.7	.01
Sample size	349	193		952	579	

^ap-values are for tests of the hypothesis that the percentage of physicians entering a particular specialty category does not relate to whether the physicians graduated from schools with Family Medicine programs. The χ^2 statistics were adjusted downward to account for unexplained effects of medical school on specialty choice.

^bPercentages do not differ from each other at the 0.15 significance level.

nonminority graduates: 11.6 percent vs. 6.1 percent ($p < 0.001$; Table 12). Moreover, this general trend appeared in each of the eight specialty categories. Family or general practitioners were located in shortage areas more often than physicians in other specialties ($p = 0.02$ for minorities; $p = 0.01$ for nonminorities). Rates for practice in shortage areas did not differ significantly among the other seven specialty categories.

The relationship of performance and SES to practicing in shortage areas differed substantially between the minority and nonminority cohorts. Among nonminorities, physicians with high performance indexes were less likely to practice in shortage areas (Table 13). However, the exact opposite relationship occurred among minority physicians. An interaction term for that distinction is significant at $p < 0.001$. Although relationships to the socioeconomic index are weaker, the same pattern emerges (Table 14). Again, the interaction term is significant ($p = 0.02$).

Table 12

PERCENTAGE OF PHYSICIANS PRACTICING IN UNDERSERVED AREAS,
BY SPECIALTY CATEGORY AND MINORITY STATUS^a

Specialty Category	Minority (n = 441)	Nonminority (n = 1262)	p-value
Family/general practice	20.3	11.1	.09
General pediatrics	9.5	7.4	NS
Obstetrics/gynecology	6.7	1.1	.09
General internal medicine	11.7	5.1	.07
Primary care	12.2	6.5	.01
Internal medicine subspecialties	11.9	5.5	NS
General surgery	18.2	6.1	.09
Surgical subspecialties	6.1	5.2	NS
Other specialties	10.8	6.3	NS
Nonprimary care	10.7	5.8	.03
Overall percentage	11.6	6.1	<.001

^aThe percentage of family practice physicians practicing in underserved areas differs from that in the other specialties ($p < 0.02$ for minority physicians, $p < 0.01$ for nonminority physicians; χ^2 with 1 degree of freedom); percentages for the other seven specialties do not differ significantly from each other (χ^2 with 6 degrees of freedom).

Table 13

PERCENTAGE OF PHYSICIANS IN MEDICALLY
UNDERSERVED AREAS, BY PERFORMANCE
CATEGORY AND MINORITY STATUS^a

Performance Category	Minority	Nonminority
300-399	8.8	6.1
400-449	12.6	9.8
450-499	9.9	6.7
500-549	15.4	4.4
550-650	40.0 ^b	.9

^aThe *inverse* relationship in the nonminority column is significant at $p = .001$ (logistic regression of practicing in a shortage area on the performance index). The *direct* relationship for minorities is significant at $p = .03$.

^bBased on only 10 physicians.

Table 14

PERCENTAGE OF PHYSICIANS IN MEDICALLY
UNDERSERVED AREAS, BY SOCIOECONOMIC
CATEGORY AND MINORITY STATUS^a

SES Category	Minority	Nonminority
14-45	10.9	8.1
45-60	14.7	5.0
60-69	17.3	5.4

^aThe *inverse* relationship in the nonminority column is significant at $p = .03$. The *direct* relationship for minorities is not significant at $p = .10$.

PATIENT CHARACTERISTICS

Black patients constituted 56 percent of the total patient population of the black graduates, whereas the mean proportions of black patients in the practices of the other groups ranged between 8 and 14 percent (Table 15). Similarly, Hispanic patients (Mexican-Americans and Puerto Ricans) represented a greater proportion of patients seen by Hispanic physicians (30 percent) than by any other racial or ethnic group of physicians (6 to 9 percent). This strong pattern persisted for each racial or ethnic group ($p < 0.001$), for each two-sample t-test.

Among female minority and nonminority physicians, minority patients were a significantly greater proportion of the total patient population than males ($p < 0.05$ for both; Table 16). Both minority and nonminority females cared for greater proportions of black patients than their male counterparts, but these differences were not statistically significant. Black graduates from Howard and Meharry had a significantly higher proportion of black patients than black graduates from the other medical schools (63.6 percent versus 54.2 percent; $p < 0.05$).

Although all physicians tended to treat relatively more patients from their own ethnic or racial group, the patient populations of most physicians were by no means segregated (Fig. 1). Fewer than half the black graduates served an overwhelmingly minority patient population; about one-fifth of the black physicians and three-fifths of the other minority physicians served patient populations that contained fewer than 40 percent minority patients.

For minority physicians, low scores on the Performance Index correlated with serving a greater percentage of minority patients ($p < 0.001$); no such correlation was observed for the nonminority graduates (Table 17).

Table 15

MEAN PERCENTAGE OF PATIENTS TREATED IN EACH RACIAL OR ETHNIC GROUP
ACCORDING TO RACE OR ETHNIC GROUP OF PHYSICIAN

Race/Ethnic Group of Patients	Race/Ethnicity of Physician ^a				
	Black	Hispanic	American Indian	Asian	White
Black	56.4 ^b	8.2	13.0	10.6	13.7
Hispanic	7.6	30.7 ^b	9.4	9.3	6.1
American Indian	0.5	0.9	7.9 ^b	0.6	1.3
Asian	2.4	2.5	2.5	15.9 ^b	2.3
White	32.9	57.6	67.1	63.6	76.5 ^b
All races	100.0	100.0	100.0	100.0	100.0
Sample size	349	64	27	42	1199

^aTable excludes physicians who are not in direct patient care.

^bThe average percentage of patients from the same ethnic or racial group (e.g., black patients of black physicians) is consistently higher than the percentage of patients treated by physicians of different ethnic groups (e.g., black patients of white physicians, black patients of Hispanic physicians). Each difference is statistically significant ($p < 0.001$, as assessed by a two-sample t-test).

Table 16

PERCENTAGE OF MINORITY PATIENTS
TREATED, ACCORDING TO SEX AND
ETHNIC GROUP OF PHYSICIAN

Physicians	Minority Patients
Minority	
Male	57.3
Female	65.9
Nonminority	
Male	20.7
Female	24.2

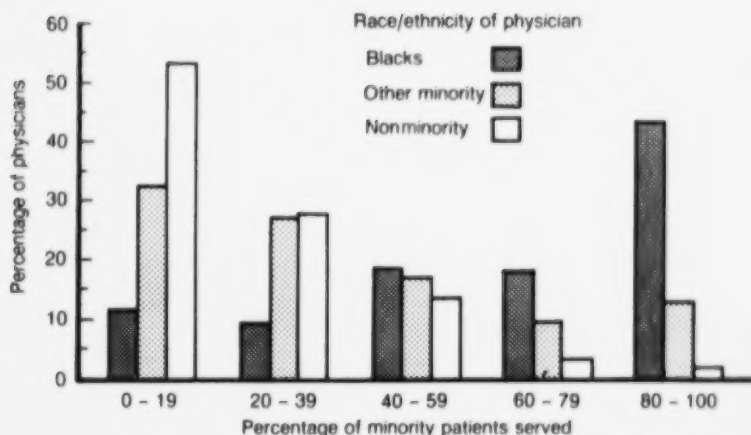


Fig. 1—Relationship between the race or ethnic group of physicians and the percentage of their minority patients

Table 17

PERCENTAGE OF MINORITY PATIENTS TREATED,
ACCORDING TO UNDERGRADUATE PERFORMANCE
INDEX AND ETHNIC STATUS

Performance Index	Minority ^a	Nonminority
300-399	64	25
400-449	63	23
450-499	56	20
500-549	36	22
550-650	52 ^b	21
Overall percentage	59	21

^aMinority patients include blacks, Hispanics, and American Indians. The differences in the nonminority column are not statistically significant (one-way analysis of variance); those in the minority column are significant ($p < 0.001$).

^bBased on only nine physicians.

Black and Hispanic graduates cared for a significantly higher percentage of Medicaid patients than did graduates from other ethnic groups ($p < 0.001$; Table 18). No differences were found in the percentage of Medicaid patients between males and females among minority and nonminority physicians, nor among black physicians who did or did not graduate from Howard or Meharry.

Within the two broad categories of minority and nonminority graduates, there was no statistically significant relation between the performance index and the percentage of Medicaid patients treated (Table 19). No statistically significant relations exist between the socioeconomic index and the percentage of Medicaid patients treated or the percentage of minority patients served.

Table 18

PERCENTAGE OF MEDICAID PATIENTS TREATED,
ACCORDING TO RACE OR ETHNIC GROUP
OF PHYSICIAN^a

Item	Black	Hispanic ^b	American Indian	Asian	White
Medicaid patients	30.8 ^c	24.2 ^c	18.9	16.2	13.7
Sample size	344	64	27	40	1128

^aTable excludes physicians not involved in direct patient care.

^bIncludes Mexican-Americans and mainland Puerto Ricans.

^c $p < 0.001$ compared with white physicians (two-sample t-test).

Table 19

PERCENTAGE OF MINORITY PATIENTS TREATED,
BY UNDERGRADUATE PERFORMANCE
INDEX AND ETHNIC STATUS^a

Performance Index	Minority	Nonminority
300-399	30	16
400-449	28	12
450-499	31	14
500-549	24	14
550-650	25 ^b	16
Overall percentage	29	14

^aThe differences are not statistically significant in either column.

^bBased on only nine physicians.

IV. PHYSICIANS IN ACADEMIC MEDICINE

After affirmative action programs expanded educational opportunities for minorities, there was a growing emphasis on increasing their opportunities to follow academic and research careers. By 1975, when our study cohort received their medical degrees, academic medicine had mounted a substantial effort to attract qualified minorities to their ranks. They were encouraged and supported in this effort by funding from the federal government and foundations. In this section, we examine the characteristics of physicians in our sample who entered academic medicine or otherwise pursued biomedical research careers, and we compare attributes of the minority and nonminority members of this group.

Each physician provides information for the *AMA Physician Masterfile* concerning his or her main professional activity. About 85 percent of our sample classified themselves as providing direct patient care. The two next most common classifications were teaching and research. Because these latter two activities typically overlap, we have combined them to define the activity *academic medicine*. Other classifications include administration and residency training.

Minorities entered academic medicine less frequently than did nonminorities (6.3 percent vs. 8.8 percent), but the difference was not strongly significant ($p = 0.10$). The difference may relate to generally lower average performance index scores for minorities because individuals with high academic achievement are more likely to enter academic careers. However, the empirical evidence for this effect in our data is equivocal (Table 20). Our analysis indicates that factors predisposing physicians to follow academic careers may be different for minorities and nonminorities. For nonminorities, entering academic medicine related strongly to premedical school performance characteristics ($p < .001$, logistic regression of entering academic medicine on the performance index); but the less-compelling relationship for minorities did not achieve statistical significance. The same distinction occurred for SES (Table 21). For nonminorities, there was a statistically significant direct relationship between SES and entering academic medicine ($p = 0.03$); the relationship was not statistically significant for minority physicians.

Entering academic medicine related strongly to specialty choice for both minorities and nonminorities (Table 22). For both, internal medicine subspecialists entered academic medicine at about three times the

Table 20

PERCENTAGE OF PHYSICIANS ENTERING ACADEMIC
MEDICINE, BY PERFORMANCE CATEGORY
AND MINORITY STATUS^a

Performance Category	Minority	Nonminority
300-399	5	3
400-449	6	6
450-499	7	7
500-549	12	10
550-650	9 ^b	18
Overall	6	9

^aThe direct relationship in the nonminority column is significant at $p = .001$ (logistic regression). The relationship for minorities is not significant ($p > 0.10$).

^bBased on only 11 physicians.

Table 21

PERCENTAGE OF PHYSICIANS ENTERING ACADEMIC
MEDICINE, BY SOCIOECONOMIC CATEGORY
AND MINORITY STATUS^a

SES Category	Minority	Nonminority
14-44	6	6
45-59	7	8
60-69	8	11
Missing SES data	6	9
Overall	6	9

^aThe direct relationship in the first three rows of the non-minority column is significant at $p = 0.03$. The relationship for minorities is not significant ($p > 0.10$).

Table 22
PERCENTAGE OF PHYSICIANS ENTERING ACADEMIC MEDICINE,
BY SPECIALTY CATEGORY AND MINORITY STATUS
(Percentage)

Specialty Category	Percentage in Academic Medicine		p-value for Specialty ^b	
	Minority	Nonminority	Minority	Nonminority
Family/general practice	5	3	—	.005
General pediatrics	13	15	.07	.03
Obstetrics-gynecology	1	7	.04	—
General internal medicine	5	10	—	—
Primary care	5	8	—	—
Internal medicine subspecialties	15	20	.01	.001
General surgery	0	2	—	.01
Surgical subspecialties	2	5	—	.01
Other specialties	9	9	—	—
Nonprimary care	7	9	—	—
Overall	6	9		

^aEntering academic medicine relates significantly to specialty at $p < 0.001$ (χ^2 on 7 d.f.) in both cohorts.

^bp-value for test that percentage entering academic medicine from that specialty category does not differ from overall percentage.

— Percentage for specialty does not differ from overall percentage at 0.10 significance level.

rate for physicians in all other specialty categories combined. In each case, pediatricians entered academic medicine at the second highest rate. Surgeons, particularly general surgeons, tended not to enter academic medicine. Overall, there was no relationship between choosing a primary-care specialty and choosing academic medicine.

For both minorities and nonminorities, women entered academic medicine at about twice the rate of men (Table 23). However, for minorities this appears to be more a specialty choice effect than a sex effect; that is, the difference relates to the tendency for minority women to choose pediatrics and to avoid surgery. Accounting for specialty, performance, and SES (by logistic regression) eliminates any statistically significant differences between minority men and women. However, the tendency for nonminority women to enter academic medicine more often than nonminority men remained significant ($p = 0.04$).

Table 23

PERCENTAGE OF PHYSICIANS ENTERING ACADEMIC MEDICINE, BY SEX AND MINORITY STATUS

Sex	Minority	Nonminority
Female	11	15
Male	5	8
p (female vs. male)	.06	.004

No significant relationships appeared with race/ethnicity within minority status; however, the sample sizes are extremely small for this type of analysis.

As would be expected, academic physicians became board certified at a very high rate (Table 24). The difference between academic and nonacademic physicians was strongest for minority physicians. Although the higher performance indexes of academic physicians explain some of the difference, it remained significant after we used logistic regression to account for performance ($p = 0.005$ and $p = 0.06$ for minorities and nonminorities, respectively).

Table 24

PERCENTAGE OF PHYSICIANS ACHIEVING BOARD CERTIFICATION, BY PRACTICE TYPE AND MINORITY STATUS

Practice Type	Minority	Nonminority
Academic medicine	76	89
All other	47	80
p-value ^a	.002	.01

^aThe p-values shown are for comparisons between the board certification rates for physicians who entered academic careers and those who did not. Separate comparisons were performed for minorities and nonminorities (χ^2 with 1 d.f.).

V. BOARD CERTIFICATION

A physician's achievement in graduate medical education is validated by his passing the certifying examination administered by an approved specialty board.¹ Increasingly, board certification is being seen in the health care community as a measure of a physician's qualifications, particularly for recent graduates. There is a small but growing body of literature that suggests board certified physicians provide higher quality of care (Lohr, 1980; Lohr, Brook, and Kausman, 1980; Williams and Brook, 1975, 1978). Therefore, board certification serves as a natural measure for comparing the accomplishments of the minority and nonminority graduates of the class of 1975.

A physician is eligible to take the certifying examination when he or she completes all the graduate training requirements of a particular board, ranging from three to seven years. Of the 23 boards, seven currently base certification only on results of written exams, and the remaining 16 require both written and oral exams (American Medical Association, 1985). Of the latter category of boards, half administer the oral examination to those who pass the written exam shortly after the candidates are notified they passed. The other half require a period of practice (as long as two years) after passing the written exam before the applicant is allowed to take the oral exam.

As an even larger proportion of U.S. medical school graduates have completed the training requirements for specialty certification, a correspondingly larger proportion of physicians have become "board certified." In 1963, about 29 percent of all active U.S. physicians were certified. By 1983, 52 percent of active physicians were certified.² As the active physician population increased by 244,400 over this 20-year period, the certification rate of this increment increased to 78 percent.³ By the fall of 1984, 71 percent of our study cohort from the class of 1975 had become certified.

¹Specialty boards are approved by the Council on Medical Education of the American Medical Association and by the American Board of Medical Specialties. There are 20 primary and 3 conjoint boards that are approved.

²The percentages are calculated from data presented in Theodore and Haug, 1968, pp. 7, 9; Roback et al., 1985, p. 58.

³Of course, some of the incremental certification rate is accounted for by members of the 1963 physician pool having become certified during the subsequent period.

BOARD CERTIFICATION BY SPECIALTY

A physician may declare himself to be a specialist without being board certified, and the proportions certified within the different self-declared specialty groups vary considerably across specialties. This has been true historically, and it is true for the class of 1975. Table 25 shows that the percentage of each specialty group that is board certified varies significantly across groups for both minorities and nonminorities. In part, these differences may reflect the different lengths of required training periods across specialties.

SEX DIFFERENCES IN BOARD CERTIFICATION RATES

Historically, a smaller proportion of female physicians have become board certified than male physicians. In 1963, some 30 percent of active male physicians were board certified, while only 19 percent of females were board certified (Theodore and Haug, 1968). These differences persisted in 1983, with 61 percent of the males and 35 percent of the females certified (Roback et al., 1985). During this period, when board certification became increasingly popular, the incremental certification for male physicians rose to 89 percent, but it rose to only 40 percent for female physicians.

Table 25

BOARD CERTIFICATION RATE, BY SPECIALTY GROUP
AND MINORITY STATUS
(Percent)

Specialty Category	Minority	Nonminority
Family/general practice	57	79
General pediatrics	50	87
Obstetrics/gynecology	36	79
General internal medicine	42	81
Primary care percentage	46	81
Internal medicine subspecialties	56	93
General surgery	44	82
Surgical subspecialties	45	81
Other specialties	55	72
Nonprimary care percentage	51	79
Overall percentage	48	80

The sex differences in certification rates persist for the nonminority members of the class of 1975 (see Table 26). However, there is no significant difference between the certification rates for minority males and females.

FACTORS AFFECTING THE CERTIFICATION RATES

The most potentially troublesome aspect of the data on specialty certification of the class of 1975 is the low certification rate for minority graduates. Some 40 percent fewer minority than nonminority graduates had become certified by 1984. Some difference in certification rates would be expected because the premedical school academic preparation of minority graduates was, on average, inferior to that of their nonminority classmates. The importance of this effect can be seen in Table 27. However, although an adjustment for premedical school performance reduces the difference in certification rates across the two groups, the difference between the two racial/ethnic groups is still large and highly significant statistically ($p < 0.001$).

Several other factors might plausibly account for some of the difference in certification rates:

- *Differences across specialties.* The time required for certification differs substantially by specialty; undoubtedly there are other differences.
- *Differences in the patient populations served.* Patients vary in their degree of sophistication regarding the medical marketplace and in the demands they place upon providers. Thus, it is reasonable to expect that patients from lower socioeconomic groups and, perhaps, minorities might be less concerned about

Table 26

BOARD CERTIFICATION RATE, BY SEX^a
(Percent)

Sex	Minority	Nonminority
Male	48	80
Female	49	73

^aThe difference between the nonminority male and female certification rates are significant ($p = 0.02$, χ^2).

Table 27

BOARD CERTIFICATION RATE, ACCORDING TO
UNDERGRADUATE PERFORMANCE INDEX
AND MINORITY STATUS^a
(Percent)

Performance Index	Minority	Nonminority
300-399	32	54
400-449	47	71
450-499	56	79
500-549	75	84
550-650	83 ^b	89
Overall	59	80

^aThe relationship between performance index category and the certification rate is significant ($p < 0.0001$, χ^2) for both minority and nonminority graduates.

^bBased on only 12 physicians.

whether their doctor is board certified. Similarly, patients in underserved areas might be satisfied to have a doctor of any kind, regardless of board certifications.

- *Differences in socioeconomic background of graduates.* In addition to the important differences in backgrounds of minority and nonminority graduates, the Hollingshead index of social position captures aspects of family background that might affect the value a graduate places on board certification. For example, family background might affect a graduate's choice to enter practice before certification or his attitude toward professional credentials.

Simple bivariate comparisons show that the probability of being certified is significantly related to many factors. However, the substantial correlations among some of these factors (e.g., between the percentage of a physician's patients from minority groups and the percentage on Medicaid, and between minority status and socioeconomic background of graduates) make such comparisons potentially misleading. Therefore, we performed multivariate statistical analysis (logistic regression) to test the effect of multiple factors on the probability of being board certified. The results of this analysis showed statistically significant

relationships between the probability of becoming certified and the following factors:

- The specialty of the physician,
- Minority status (lower for minorities),
- The performance index,
- The percentage of Medicaid patients in the doctor's practice (the more Medicaid patients, the lower the probability of being certified), and
- Sex of nonminority graduates (lower for females).

The performance index had the strongest effect on probability of certification followed by minority status and percentage of Medicaid patients in the physician's practice. Specialty category and sex (for nonminorities only) were weaker but still statistically significant predictors. However, the relationships to other factors (socioeconomic status, percentage of minority patients in the doctor's practice, and service in a medically underserved area), which were significant in simple bivariate analysis, no longer appeared in the *multivariate* analysis.

The certification rates for minority and nonminority graduates, adjusted for these other factors, are shown in Table 28. By comparing this table with Table 25, one can see how controlling for the differences between the minority and nonminority cohorts affects certification rates.

CERTIFICATION RATES FOR HOWARD AND MEHARRY GRADUATES

Before affirmative action programs, the vast majority of black physicians were trained at Howard University and Meharry medical schools, which had almost exclusively black student bodies. These two medical schools have continued to graduate predominantly black doctors, but they no longer account for the majority of black physicians trained in the United States. With the significant and important role of Howard and Meharry in the education of minority doctors, an obvious question arises regarding the performance of minorities from these two schools compared with the minority graduates of schools having mostly non-minority student bodies.

Exploratory data analysis revealed that the two predominantly black medical schools differed from one another in the characteristics of their graduates. It also showed that neither of the two schools had minority graduates other than blacks in our 1975 sample. Hence, the most meaningful analysis compares the black graduates of each of these two schools with the black graduates of all other schools.

Table 28

PERCENTAGE OF PHYSICIANS ACHIEVING BOARD CERTIFICATION,
BY SPECIALTY CATEGORY AND MINORITY STATUS
ADJUSTED FOR PERFORMANCE AND PROPORTION
OF MEDICAID-SUPPORTED PATIENTS

Specialty Category	Minority ^a	Nonminority
Family/general practice	70	73
General pediatrics	63	83
Obstetrics/gynecology	50	75
General internal medicine	53	73
Primary care	59	75
Internal medicine subspecialties	67	89
General surgery	58	77
Surgical subspecialties	58	79
Other nonprimary care	63	63
Nonprimary care	61	74

^aThe interaction between minority status of the physician and specialty choice is significant at $p < 0.005$.

About twice as many of the graduates of Howard had become board certified as had graduates of Meharry by 1984 (43 vs. 21 percent). However, our data also show that Meharry had a significantly larger proportion of graduates with lower performance index scores than either Howard or other medical schools, which could explain the differential certification rates. To control for these differences in the performance index scores and other factors, we performed multivariate analysis to estimate the likelihood of becoming board certified. The structure of the logistic regression analysis was similar to that described above except that we analyzed only the black graduates.

The results of our analysis show significant effects of performance index score and specialty, as in the case of our earlier analysis. The analysis also showed a significant negative effect on certification probability for being a Meharry graduate. There was no significant effect for Howard graduates. We conclude from this analysis that the large difference in certification rates between graduates of Meharry and all other black graduates is almost entirely due to the combination of a Meharry "school effect" and differences in performance scores. Table 29 shows the percentage of black graduates who were board certified in each of five performance categories, for Meharry and all other medical schools.

Table 29

PERCENTAGE OF BLACK PHYSICIANS WHO BECAME
BOARD CERTIFIED AT MEHARRY VERSUS ALL
OTHER SCHOOLS, BY PERFORMANCE CATEGORY

Performance Index	Meharry	All Others
300-399	28	33
400-449	15	48
450-499	0 ^a	60
500-549	(b)	82
550-650	(b)	67 ^c
Total	21	48

^aBased on only four physicians.

^bThere was only one Meharry graduate with a performance index above 500.

^cBased on only six physicians.

VI. CONCLUSIONS

The national commitment to affirmative action was motivated by multiple social concerns. The same was true for the affirmative action programs designed specifically to facilitate entry of minority students into the nation's medical schools. These concerns included:

- Increasing the absolute numbers of minority physicians;
- Bringing the ethnic/racial mix of medical school classes into balance with that of the general population;
- Changing the specialty mix of medicine to meet policy objectives;
- Eliminating ethnic/racial barriers within the medical profession;
- Rectifying the perceived geographic maldistribution of physicians;
- Providing physicians to treat minority populations specifically, and the poor more generally;
- Improving the upward social mobility of disadvantaged minority groups by providing access to prestigious professions, including academic medicine.

Although health policymakers and the academic medical community reached a consensus regarding the desirability of affirmative action, there was no consensus about the relative importance of the multiple social objectives that motivated it. Indeed, progress toward some objectives can be gained only at the expense of others: For example, the more minority physicians serve their own ethnic/racial subgroups, the less the broader objectives of social integration will be achieved. Disproportion in the number of minority physicians entering certain subspecialties will persist if almost all minorities enter the primary care specialties.

We have avoided making any normative assessments regarding the relative importance of the various objectives, including the ones that are in direct opposition to one another. Rather, our objective has been to make an empirical examination of multiple effects of affirmative action programs. The results of our analysis should be generally encouraging to the advocates of affirmative action, whichever social objectives they weighted most heavily.

By 1975, many more minorities were receiving M.D. degrees than had been five or ten years previously, and medical schools had

admitted and graduated many students who would not have been admitted by conventional criteria. To be sure, the proportions of minorities in medical school student bodies still have not reached the levels of their representation within the general population. In addition, the proportion of minority graduates from U.S. medical schools (6.3 percent for the class of 1975 and 8.6 percent for the class of 1985) is less than the proportion among U.S. college graduates (14.8 percent). Indeed, one might conclude from the analysis in this report that it is infeasible to equalize these proportions unless a great deal more attention is given to the early educational preparation of minorities for careers in medicine.

Compared with nonminorities, minority graduates of the class of 1975 chose specialties more in accord with articulated federal health manpower policy of the mid-1970s to increase the number of primary care specialists. Moreover, they invested time in graduate medical education that made them better qualified medically than the general practitioners who constituted much of the minority physician pool a decade earlier.

Although minority physicians entered primary care specialties in larger proportions than their nonminority classmates, there is an impressive dispersion of minority physicians across all specialties. Racial/ethnic barriers to some specialties of a decade or so ago have apparently been lowered; there are increasing numbers of minority physicians in all specialties.

During the 1970s, federal policy sought to rectify a perceived geographic maldistribution of physicians by designating health manpower shortage areas and offering new graduates incentives to locate there. A larger proportion of minority than nonminority graduates of the class of 1975 have practices in those areas. Thus, the location patterns of minority physicians are consistent with the objectives of federal manpower policy.

The minority graduates of 1975 treat more patients from their own ethnic/racial groups than do their nonminority counterparts, which is a continuation of past trends. However, our data show that the patient populations of many black physicians are substantially integrated, which appears to be a change from the situation in the 1950s and 1960s. The data suggest that by increasing the number of minority physicians, affirmative action programs have substantially improved access to care among minority populations, although an analysis of the patient populations of all physicians would be necessary to establish this effect with certainty.

Minority physicians also serve significantly larger proportions of Medicaid patients than do their nonminority counterparts, not merely

because minorities are more heavily represented in the Medicaid population. Even after accounting for the racial mix of the patients served, we found that minority physicians treat larger proportions of poor patients ($p < 0.05$).

As might be expected from the differences in their premedical school preparation, a smaller proportion of minority graduates (6.3 percent) entered academic medicine than their nonminority classmates (8.8 percent). However, the differences are not very significant. There is a strong relationship between the performance index and choice of academic career for nonminorities, but the relationship is, at most, weak for minorities. The nonminority academic physicians are clearly drawn disproportionately from higher socioeconomic strata, but that is much less the case for minorities.

Only about half of the minority physician graduates of 1975 had become board certified in their specialty by the time of our study. This certification rate, which is much below that of their nonminority classmates, was only partly predictable by the lower average premedical school performance of the minority graduates. That is, the minority certification rate is still significantly lower than that of nonminorities, even after the differences in premedical school characteristics are controlled for. Other factors, including the sex of the physician, the specialty entered, and the patient population served, account for part of the remaining difference between minority and nonminority certification rates. Of these three factors, the lower certification rates among physicians who treat higher proportions of Medicaid patients pose the most interesting problem of interpretation: Physicians who serve these groups may be as competent as their certified classmates but are not seeking board certification because the credential is unimportant in the marketplace where they practice. Alternatively, less well trained, uncertified physicians may be able to attract patient populations only from among the poor. In either case, it is an inescapable and disturbing fact that minority physicians fail to become board certified at the same rates as nonminority physicians who are alike on all other dimensions we measured.

Throughout our analysis, we examined differences between the graduates of two predominantly black medical schools and black graduates of other medical schools. For most measures we found few, if any, differences of note; but such was not the case for board certification. Although Howard graduates were indistinguishable from the graduates of other schools, Meharry graduates became certified at significantly lower rates, even after all other factors were accounted for.

Associations between premedical school performance and the dependent variables were significant only for limited cases: specialty choice,

but not primary vs. nonprimary care; board certification; location in underserved areas; and the percentage of minority patients treated by minority graduates. Only for board certification and, perhaps, practice location does premedical school performance account for a substantial part of the gap between minorities and nonminorities. Nonminority physicians from lower socioeconomic strata more often located in health manpower shortage areas, but no such relationship exists for minority physicians. Perhaps within both minority and nonminority groups, physicians from lower strata do not disproportionately serve disadvantaged groups, as measured by the percentage of minority or Medicaid patients they treat. Thus, the strong tendency of minority graduates to enter primary care and to treat minority and Medicaid patients is explained by factors other than their premedical school performance and socioeconomic backgrounds.

Affirmative action for minorities represented a major change in public policy and social action. This change was implemented by a wide-ranging set of public and private programs and more subtle changes in attitudes about appropriate actions to achieve equality of opportunity among racial/ethnic groups, in the broadest sense of the term. Affirmative action programs in medicine, as in other professions, were motivated in part by these broad social-integration objectives and in part by profession-specific objectives.

The data on the class of 1975 from U.S. medical schools provide strong testimony that both kinds of objectives are being served by the programs. The professional opportunities for minorities clearly improved, and, as a bonus, the medical care system was also changed considerably by their entry. Minorities were not merely admitted to medical schools in much larger numbers, they also graduated, took residency training, and entered practice in much larger numbers. Moreover, they entered primary care specialties, chose to practice in federally designated health manpower shortage areas, and cared for ethnic minority and poor patients in a greater proportion than did their nonminority counterparts.

While there is much cause for satisfaction with the results of affirmative action, the policy cannot be considered an unqualified success. The lower rate of specialty board certification among minorities should be a matter of concern. This lower rate can be explained in substantial part by the minority graduates' premedical school academic characteristics and by the patient populations they serve. However, there is no escaping concern even with the most favorable interpretations of either of these findings. Although lower premedical school achievements among minorities would be expected to result in lower certification rates, it is troublesome that affirmative action programs have not

succeeded in raising their rates, at least to those of comparable nonminorities. Although minorities may be less predisposed to become board certified because that credential is not very important to the patient populations they serve, one must be at least somewhat concerned that quality of patient care may suffer when certification standards are not met by those who serve the poor.

It is also somewhat disappointing that the numerical goals of minority enrollments do not appear to be within easy reach. If such goals are to be attained without sacrificing quality, it will be necessary to increase the size and improve the academic standards of the minority applicant pool. To do so seems likely to require considerable educational interventions to improve the quality of premedical education that minorities receive—interventions that go back at least as far as high school.

Although the record of affirmative action in medical education can and should be improved in some respects, there should be no question of its overall success. Our analysis found that the program made good progress toward multiple objectives. As we have pointed out, some objectives compete with one another (e.g., increased access to care for minorities and integration of minority physicians into society), and the practice decisions of a single minority graduate might or might not be viewed as appropriate, depending upon the perspective of any particular affirmative action advocate. Most important, the programs seem to have achieved something positive for all affirmative action advocates. Hence, we can avoid the uncomfortable task of weighting the multiple worthy objectives.

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